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15. According to these results the process of determining a radiant from three meteors is in general sound, though the chance of at least one radiant of this sort being found among several meteors may be considerable. This and similar questions I may profitably leave to those of a greater practical acquaintance with the subject.

On the Variable Star Y Aurigæ (*Ch.* 1929).

By A. Stanley Williams.

$$\text{R.A.} = 5^{\text{h}}\ 18^{\text{m}}\ 20^{\text{s}},\ \text{Decl.} = +42^{\circ}\ 18'{\cdot}5\ (1855)$$
$$\text{,,}\ = 5\ 21\ 32,\ \text{,,}\ = +42\ 21{\cdot}1\ (1900)$$

When the unknown period of a variable star is longer than a few days there is usually little difficulty in ascertaining its real length, since both this and the form of the light curve can generally be derived directly from the observations made night by night. There is likewise not usually any very great difficulty when the period is much less than a day, for then the variation is so rapid that the observations of a few consecutive hours are sufficient to indicate the correct period. It is when the period falls between about one day and four or five days that the most difficulty arises, and the difficulty is intensified when the increase in brightness is much more rapid than the decrease, since in such cases a marked change in the brightness of the star may be noticed in a few hours, giving rise to the impression that the period is a much shorter one than it really is. The variable *Y Aurigæ* belongs to this last-mentioned class. In the *Astronomische Nachrichten*, No. 3708, the period of this star was stated by the writer to be $0^{\text{d}}{\cdot}7925$, this period satisfying all the data at the time available, whilst some observations made during the increase seemed to show that the period must be a very short one, there being a considerable increase in brightness in the course of three or four hours. But recently, upon reducing the observations of this star made here during the past four years, it was found that this very short period failed to satisfy them for any very long interval of time ; nor could any variation of the same very short period be made to do so. On the other hand, a period of $3^{\text{d}}{\cdot}862$, or thereabouts, seemed to satisfactorily represent all the observations. The present paper contains a discussion of the observations made here during the last four years, and in order that the whole of the evidence as to the real period and light curve may be accessible, the actual observations have been stated in full.

The observations in question were all made with a power of 75 on a $2\frac{3}{4}$-inch refractor, and in order to eliminate the effects

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of "position error" the observer's head was always so held that the eyes were parallel to a line joining the two stars BD. +42° 1298 and BD. +42° 1291, the last-mentioned star being to the left. The comparison stars used and the adopted light scales and magnitudes are given in the following table:—

Table I.

Comparison Stars.

Star.	Name.	BD. Mag.	Light Scale.			Adopted Magnitude.
			a—1.	*a*—2.	*b*.	
h	BD. +42° 1291	8·2	...	27·4	31·6	8·19
l	BD. +42 1305	9·0	15·4	23·4	...	8·47
f	BD. +42 1301	9·0	12·1	17·7	21·9	8·85
b	BD. +42 1297	9·5	6·4	7·9	7·2	9·52
c	BD. +42 1302	9·4	5·0	5·0	5·0	9·72

In the 4th, 5th, and 6th columns of the above table are three distinct light scales, that headed *a*—1 being derived from the observations of 1901, and that *a*—2 from the observations of 1902 and 1903. The light scale *b* has been added for the purpose of comparison only. It was derived from sequences of steps made on seven nights in 1902–3, the head being held so that the eyes were parallel to a line joining the two stars undergoing comparison,* instead of with the eyes parallel to the two stars referred to above. It will be seen that the two light scales *a*—1 and *a*—2 differ widely from each other; and it is clear that a great change must have occurred in the observer's habit of observing between 1901 and 1902–3, the value of a step having diminished by nearly a half. The exact step values are 0$^{\mathrm{m}}$·120 for 1901, and 0$^{\mathrm{m}}$·068 for 1902–3. No sensible change seems to have occurred, however, apart from this alteration of step value, the ratio between the brightnesses of the stars remaining unaltered. The last column of the above table gives the adopted magnitudes of the comparison stars.

Table II. contains all the original observations. In the 6th column will be found the deduced brightness of the variable, expressed according to the light scale *a*—1 for the observations of 1901, and according to the scale *a*—2 for the subsequent observations. The last column gives the corresponding magnitude. The observations of 1904 were reduced by means of the light scale *a*—2, though they had not entered into the formation of that scale.

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* This is the method of observing at present employed by the writer in observing all variable stars excepting *Y Aurigæ*, as it appears that observations made in this way are, so far as he is concerned, practically free from the effects of "position error." This might not, however, be the case with the observations of another observer.

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TABLE II.

Observations.

No.	Date.	G.M.T.	J.D. 241.	Observations.	Bright-ness (a−1).	Mag.	
	1901.	h m					
1	Feb. 6	15 30	5422·65	v 2 b, v 2 c, f 5 v, l 8 v	7·5	9·40	
2	11	13 15	5427·55	b 1 v o c	5·1	9·69	
3	13	13 00	5429·54	v 3 b, v 3 c, f 2 v, l 5 v	9·4	9·17	(1)
4	20	12 45	5436·53	v 7 b, v 9 c, v o f	12·7	8·78	
5	Mar. 1	12 15	5445·51	v 1 b, v 3 c	7·7	9·38	
6	3	13 00	5447·54	v 1 f, v 6 b, v 7 c	12·5	8·80	
7	12	11 40	5456·49	l 5 v 5 b, f 1 v 6 c	11·1	8·97	(2)
8	13	12 15	5457·51	b 2 v	4·4	9·77	(3)
9	18	11 10	5462·47	b o v 1 c	6·3	9·55	
10	21	12 45	5465·53	b 1 v o c	5·1	9·69	
11	22	10 30	5466·44	b o v 2 c	6·5	9·52	
12	24	11 00	5468·46	v 1 b, v 2 c	7·2	9·44	(4)
13	25	11 30	5469·48	b o v 1 c	6·3	9·55	
14	26	10 10	5470·42	v 3 b, v 4 c	9·2	9·20	
15		11 55	5470·50	f 1 v 5 b, v 6 c	11·2	8·96	
16		12 55	5470·54	f o v 6 b, v 7 c	12·2	8·84	
17	27	10 10	5471·42	v 1 f, v 6 b	12·8	8·77	
18		11 55	5471·50	v 1 f, v 6 b	12·8	8·77	(5)
19	28	11 00	5472·46	f 3 v 2 b, v 3 c	8·6	9·27	
20		12 30	5472·52	f 4 v 2 b, v 3 c	8·2	9·32	
21	29	10 15	5473·43	b 0·5 v o c, f 6 v	5·3	9·67	(6)
22	31	10 00	5475·42	f o ± v 5 b	11·4	8·93	(7)
23	Apr. 1	10 00	5476·42	f 3 v 2 b, v 3 c	8·6	9·27	
24		12 00	5476·50	f 5 v 0·5 b	6·9	9·47	
25	4	9 50	5479·41	v 3 b	9·4	9·17	(8)
26	12	9 50	5487·41	f 1 v 4 b, v 5 c	10·7	9·02	
27	13	10 30	5488·44	b 1 v	5·4	9·65	
28	14	9 05	5489·38	b 1 v	5·4	9·65	
29	15	10 00	5490·42	v 2 f, v 7 b	13·7	8·66	
30	17	9 50	5492·41	b 1 v	5·4	9·65	(9)
31	18	9 40	5493·40	v o ± b	6·4 ±	9·53 ±	(10)
32	19	9 45	5494·41	v 1 f, v 6 b	12·7	8·78	
33	20	9 45	5495·41	f 3 v 2 b, v 5 c	8·7	9·26	
34	21	9 00	5496·38	b o v 2 c	6·7	9·50	
35	22	9 25	5497·39	v o b	6·4	9·53	
36		9 38	5497·40	v 1 b	7·4	9·41	

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No.	Date.	G.M.T.	J.D. 241.	Observations.	Brightness (a−1).	Mag.	
	1901.	h m					
37	Apr. 22	10 00	5497·42	v 2 b	8·4	9·29	(10)
38		10 25	5497·43	v 3 b	9·4	9·17	(11)
39	23	9 00	5498·38	v 2 f, v 6 b	13·3	8·71	
40		11 00	5498·46	v 0·5 f, v 5 b	12·0	8·86	
41	24	9 30	5499·40	v 2 b	8·4	9·29	(12)
42	25	9 35	5500·40	v 0 b	6·4	9·53	
43	26	9 10	5501·38	v 1 b, v 3 c	7·7	9·38	(13)
44		9 25	5501·39	f 2 v 3 b, v 5 c	9·8	9·13	
45		9 50	5501·40	f 0 v 4 b	11·2	8·96	
46		10 00	5501·42	f 0·5 v 5 b	11·5	8·92	
47		10 20	5501·43	v 0·5 f, v 6 b	12·5	8·80	
48		10 35	5501·44	v 2 f, v 7 b	13·7	8·66	
49		11 00	5501·46	v 2 f, v 7 b	13·7	8·66	(14)
50	28	8 50	5503·37	v 3·5 b	9·9	9·11	
51	May 3	9 00	5508·38	b 1 v	5·4	9·65	
52	5	9 00	5510·38	f 0 v 5 b	11·7	8·90	
53	6	9 35	5511·40	v 0 b	6·4	9·53	
54	13	10 00	5518·42	f 1 v 4 b	10·9	8·99	
55	14	9 50	5519·41	f 5 v 0·5 b, v 3 c	7·1	9·45	
56	15	9 50	5520·41	b 0·5 v	5·9	9·59	
57	17	10 00	5522·42	b 1 v	5·4	9·65	(15)
58	18	10 00	5523·42	v 0 b	6·4	9·53	
59	20	9 55	5525·41	f 3 v 7 b	14·2	8·60	
60	21	9 50	5526·41	f 3 v 2 b	8·7	9·26	
61	22	10 05	5527·42	v 0 b	6·4	9·53	
62	23	10 00	5528·42	v 0·5 b	6·9	9·47	
63	24	10 10	5529·42	v 6 b	12·4	8·81	(16)
64	Aug. 6	13 53	5603·58	f 6 v, b 1 v 1 c	5·7	9·62	
65	8	11 50	5605·49	f 2 v 3 b	9·8	9·13	
66	10	12 55	5607·54	f 3 v 2 b, v 2 c	8·5	9·26	
67	11	14 30	5608·60	f 6 v 0 b, v 0·5 c	5·8	9·61	
68	15	11 30	5612·48	b 1 v 0 c, f 6 v	5·5	9·64	
69	16	11 40	5613·49	v 1·5 f, v 7 b, v 8 c	13·3	8·71	
70	18	11 05	5615·46	f 4 v 1 b, v 1 c	7·4	9·41	
71		14 00	5615·58	f 6 v 0 b, v 1 c	6·2	9·56	
72	19	11 25	5616·48	f 5 v 0 b	6·5	9·52	
73		14 15	5616·59	f 6 v 0·5 b, v 2 c	6·7	9 50	
74	20	11 15	5617·47	v 3 f, v 9 b, v 11 c	15·5	8·44	

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No.	Date.		G.M.T.		J.D. 241.	Observations.	Brightness ($a-1$).	Mag.	
	1901.		h	m					
75	Aug.	21	11	17	5618·47	f 3 v 3 b, (v 6 c)	9·3	9·19	(17)
76			14	15	5618·59	f 4·5 v 2·5 b, (v 7 c)	8·3	9·31	
77		22	12	08	5619·51	f 5·5 v 0 b, v 2 c	6·8	9·49	
78		23	11	35	5620·48	b 1 v 3 c, f 7 v	6·1	9·57	
79			14	15	5620·59	b 1 v, (v 5 c), f 7 v	5·3	9·67	
80		24	13	25	5621·56	v 2·5 f, v 8·5 b	14·7	8·54	
81		26	11	50	5623·49	v 0 b	6·4	9·53	
82		27	14	10	5624·59	f 1 v 5 b	11·2	8·96	
83	Sept.	1	11	05	5629·46	v 2 f, v 7 b	13·8	8·65	(18)
84		3	10	40	5631·44	f 3 v 3 b	9·3	9·19	
85		4	10	10	5632·42	f 5 v 0 b	6·5	9·52	
86		5	10	20	5633·43	f 2 v 3 b	9·8	9·13	(19)
87			11	18	5633·47	v 1 f, v 7 b	13·2	8·72	(19)
88			12	32	5633·52	v 3 f, v 8 b	14·8	8·53	
	1902.						Scale $a-2$.		
89	Mar.	4	12	25	5813·52	f 9 v, b 1 v	8·8	9·45	
90		5	11	50	5814·49	v 2 f, v 10 b, v 12 c	18·8	8·78	
91		6	12	15	5815·51	f 5 v 4·5 b, v 6 c	12·3	9·22	
92	Apr.	3	10	10	5843·42	v 0 b	7·9	9·52	(20)
93		6	10	45	5846·45	f 6 v 3 b, v 5 c	11·0	9·31	
94		24	9	15	5864·39	v 3 f, v 9 b, v 12 c	18·8	8·78	
95		27	9	45	5867·41	b 1·5 v 2 c, f 10 v	6·9	9·58	
96		28	9	15	5868·39	v 11 b 2 c, v 1 f	18·7	8·78	
97			10	18	5868·43	v 11 b 2 c, v 1 f	18·7	8·78	
98	July	28	13	00	5959·54	b 1 v	8·9	9·45	
99	Aug.	24	14	55	5986·62	b 2 v 3 c	6·8	9·59	
100		25	13	07	5987·55	f 2 v 7 b, v 12 c	16·8	8·91	
101		27	12	55	5989·54	f 10 v 3 b, v 6 c	10·0	9·37	
102		28	14	35	5990·61	b 1 v 4 c, f 10 v	7·6	9·54	
103	Sept.	6	12	10	5999·51	v 3 f, v 13 b	20·7	8·65	
104		7	11	10	6000·47	f 3 v 6 b	14·4	9·07	
105		8	12	17	6001·51	b 0 v 4 c	8·3	9·49	
106		26	11	15	6019·47	f 0 v 9 b, v 12 c	17·3	8·88	
	1903.								
107	Jan.	28	15	35	6143·65	f 5 v 7 b	13·7	9·12	
108	Mar.	21	12	27	6195·52	b 1 v 2 c	7·0	9·58	
109		22	11	27	6196·48	f 2 v 9 b	16·1	8·96	
110		26	11	10	6200·47	f 4 v 10 b	15·3	9·01	
111	Apr.	22	10	35	6227·44	f 2 v 8 b, v 9 c	15·5	9·00	

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No.	Date.	G.M.T.	J.D. 241.	Observations.	Brightness ($a-1$).	Mag.	
	1904.	h m					
112	Mar. 8	11 55	6548·50	f 4 v 8 b, v 9 c	14·4	9·07	(20)
113	10	12 30	6550·52	b 1 v 2 c	7·0	9·58	
114	22	11 45	6562·49	b 2 v 1 c	6·0	9·65	
115		12 45	6562·53	b 0 v 3 c	7·9	9·52	
116	Apr. 1	9 55	6572·41	f 7 v 2 b, v 4 c	10·0	9·37	
117	6	10 00	6577·42	b 1 v 2 c	7·0	9·58	
118	9	10 00	6580·42	f 10 v 0 b, v 2 c	7·7	9·53	
119	10	10 20	6581·43	b 2 v 0 c	5·2	9·70	
120		11 50	6581·49	v 0 b	7·9	9·52	
121	11	10 00	6582·42	v 2 f, v 12 b	19·8	8·70	
122	12	10 00	6583·42	f 6 v 4 b	11·8	9·25	
123	13	10 00	6584·42	b 1 v 1 c	6·5	9·62	(21)
124	15	9 50	6586·41	v 1 f, v 11 b	18·1	8·78	(22)
125	16	10 05	6587·42	f 7 v 3 b, v 6 c	10·9	9·31	
126	17	10 03	6588·42	b 2 v 1 c	6·0	9·65	(23)
127	18	9 20	6589·39	b 2 v 0 c	5·2	9·70	
128		11 00	6589·46	f 10 b 0 v 4 c	7·7	9·53	(24)
129	20	9 40	6591·40	f 7 v 3 b, v 5 c	10·6	9·33	

Notes.—(1) Clouds. (2) Not good, hazy. Var. seemed reddish or orange-coloured. (3) Thin cloud. (4) Hazy. (5) Poor obs., hazy and sky very bright. (6) Clouds. (7) Cirrus cloud. (8) Not satisfactory, sky very bright. (9) Hazy. (10) Cloud. (11) Thin cloud. (12) Thin cloud. (13) Probably an underestimate. (14) Not good, clouds. (15) Thin cloud. (16) Rough obs., thin cloud. (17) c seems very faint to-night. (18) Poor obs. (19) Not good. (20) Cloud directly after. (21) Misty cloud about. (22) Considerable thin cloud. (23) Some thin cloud. (24) Unsatisfactory, altitude low and stars unsteady.

The clearness of the sky and the interference from moonlight have always been recorded during the last two years ; but as this was not done in the case of the earlier observations, the particulars have been omitted from the above table. It may be stated, however, generally that moonlight seems to exercise very little influence upon the observations of the writer, and that all the cases in which the observations may have been seriously affected by the state of the sky have been mentioned in the foregoing notes. Except where otherwise mentioned, the observations may be regarded as satisfactory. In ordinary variable star work observations are usually not made under very unfavourable circumstances, but at first, when the nature of the variation was quite unknown, the star was observed whenever visible. This accounts for the relatively large number of observations that are mentioned as being certainly or possibly affected by cloud, &c.

A preliminary investigation having shown that the observa-

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tions were nearly satisfied by a period of $3^{d}{\cdot}862$, an ephemeris was computed from the following elements (Elements I.) :—

$$\text{Maximum} = \text{J.D. } 2415420{\cdot}354 + 3^{d}{\cdot}862\ \text{E}$$

and the observations were formed into seven groups and plotted upon transparent squared paper according to the intervals by which they followed the computed times of maximum. Three of the resulting charts were then superimposed one upon the other, and a provisional mean light curve (A) carefully drawn. By means of this provisional mean light curve the times of seven mean or normal maxima were then determined from the observations for a date corresponding approximately to the middle of each group. The details of these mean maxima are given in Table III.

TABLE III

Provisional Mean Maxima.

E.	Mean Obs. Maximum.	Computed Maximum (II.).	O − C. d	No. of Obs.
9	J.D. 2415455·347	5455·371	−0·024	33
24	5513·373	5513·254	+0·119	30
51	5617·500	5617·445	+0·055	25
110	5845·000	5845·120	−0·120	9
150	5999·437	5999·476	−0·039	9
201	6196·185	6196·280	−0·095	5
299	6574·555	6574·428	+0·127	18

The following elements (Elements II.) were derived from the foregoing provisional mean maxima :—

$$\text{Maximum} = \text{J.D. } 2415420{\cdot}641 + 3^{d}{\cdot}8589\ \text{E}$$

and the computed times of maximum according to these elements and the residuals O—C are stated in columns 3 and 4 of the above table.

Table IV. contains the observations arranged in order of the time by which they follow the last preceding maximum computed by means of the above elements (II.). The first column gives the number of the observation in Table II., the second the interval following maximum, and the third the observed magnitude. In two or three cases, where several observations were made on the same night, mean values are given in this table. Observations followed by : may possibly have been affected by cloud. Those followed by :: were certainly so affected.

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TABLE IV.

Observations in Order of Distance from Maximum.

No. of Obs.	Dist. from Max. d	Mag.	No. of Obs.	Dist. from Max. d	Mag.	No. of Obs.	Dist. from Max. d	Mag.
74	0·03	8·44	91	1·26	9·22	126	2·39	9·65 :
103	0·03	8·65	54	1·31	8·99	34	2·42	9·50
96	0·12	8·78	93	1·33	9·31	84	2·42	[9·19]
97	0·16	8·78	107	1·39	9·12	10	2·44	9·69
109	0·20	8·96	125	1·39	9·31	58	2·45	9·53
90	0·24	8·78	33	1·45	9·26	98	2·51	9·45
121	0·25	8·70	57	1·45	[9·65::]	13	2·53	9·55
80	0·26	8·54	12	1·51	[9·44::]	42	2·58	9·53
111	0·29	9·00	129	1·51	9·33	99	2·58	9·59
29	0·32	8·66	64	1·57	[9·62]	61	2·59	9·53
110	0·33	9·01	41	1·58	[9·29::]	21	2·62	9·67 :
124	0·38	8·78 :	60	1·58	9·26	102	2·71	9·54
83	0·44	8·65 :	101	1·60	9·37	67	2·73	9·61
4	0·45	8·78	19	1·65	9·27	68	2·75	9·64
32	0·45	8·78	66	1·67	9·28	51	2·84	9·65
39	0·56	8·71	50	1·69	9·11	72	2·89	9·52 :
59	0·58	8·60	20	1·71	9·32	117	2·97	9·58
17	0·61	8·77	5	1·72	9·38	73	3·00	9·50
40	0·64	8·86	23	1·75	9·27	95	3·00	9·58
86 to 88	0·64	8·73	116	1·82	9·37	78	3·04	9·57
			24	1·83	9·47	2	3·05	9·69
18	0·69	8·77 :	70	1·87	9·41	113	3·08	9·58
106	0·70	8·88	71	1·99	9·56	108	3·10	9·58
63	0·73	[8·81::]	53	2·00	9·53	119	3·12	9·70
22	0·75	8·93 :	1	2·01	9·40	89	3·13	9·45
25	0·89	9·17 :	105	2·03	9·49	28	3·14	9·65
52	0·98	8·90	77	2·07	9·49	79	3·15	9·67
104	0·99	9·07	118	2·11	9·53	120	3·18	9·52
75	1·03	9·19	8	2·14	[9·77 :]	9	3·24	9·55
112	1·06	9·07	92	2·16	9·52 :	82	3·29	[8·96 :]
7	1·12	8·97 :	81	2·19	9·53	31	3·30	[9·53::]
76	1·15	9·31	27	2·20	9·65	56	3·30	9·59
26	1·17	9·02	123	2·25	9·62 :	11	3·35	9·52
3	1·18	9·17 :	55	2·30	9·45	127	3·36	9·70
122	1·25	9·25	30	2·31	9·65	85	3·40	9·52

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No. of Obs.	Dist. from Max. d	Mag.	No. of Obs.	Dist. from Max. d	Mag.	No. of Obs.	Dist. from Max. d	Mag.
128	3·43	9·53 :	115	3·51	9·52	43 to 49	3·60	8·89
35 to 38	3·44	9·41	100	3·51	8·91	6	3·75	8·80
114	3·47	9·65	14 to 16	3·54	9·00	69	3·76	8·71
65	3·48	9·13	62	3·59	9·47	94	3·83	8·78

Table V. is Table IV. condensed, the observations having been formed into groups of four * and the means taken. In forming these means the observations bracketed in Table IV. have been rejected. Nearly all of them are marked with either : or ::, indicating that they were respectively possibly or certainly affected by cloud. A few discordant observations not so marked are considered later on.

Table V.

Mean Observations.

No. of Group.	Dist. from Max. d	Mag. from Curve.	Mag. from Obs.	C—O. mag.	No. of Group.	Dist. from Max. d	Mag. from Curve.	Mag. from Obs.	C—O. mag.
1	0·08	8·66	8·66	·00	14	2·03	9·50	9·48	+·02
2	0·24	8·74	8·74	·00	15	2·17	9·54	9·56	−·02
3	0·32	8·77	8·87	−·10	16	2·31	9·57	9·59	−·02
4	0·48	8·83	8·74	+·09	17	2·45	9·58	9·54	+·04
5	0·62	8·89	8·74	+·15	18	2·57	9·59	9·56	+·03
6	0·75	8·94	8·93	+·01	19	2·71	9·59	9·61	−·02
7	1·01	9·06	9·06	·00	20	2·90	9·60	9·57	+·03
8	1·16	9·13	9·13	·00	21	3·07	9·60	9·60	·00
9	1·29	9·19	9·19	·00	22	3·13	9·60	9·62	−·02
10	1·43	9·25	9·25	·00	23	3·27	9·57	9·54	+·03
11	1·62	9·32	9·29	+·03	24	3·40	9·44	9·54	−·10
12	1·72	9·36	9·27	+·09	25	3·50	9·27	9·24	+·03
13	1·88	9·43	9·45	−·02	26	3·71	8·89	8·93	−·04

The above observations having been plotted in diagram form, the mean light curve (B) reproduced in the adjoining figure was drawn. The magnitudes according to this curve are given in the above table next to the observed mean magnitudes, together with the differences C—O. It will be seen from the smallness of these differences in general,† and it will also appear on inspection of

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* In the last three cases there are five observations to a group.

† The average difference C—O is ± 0·03 mag.

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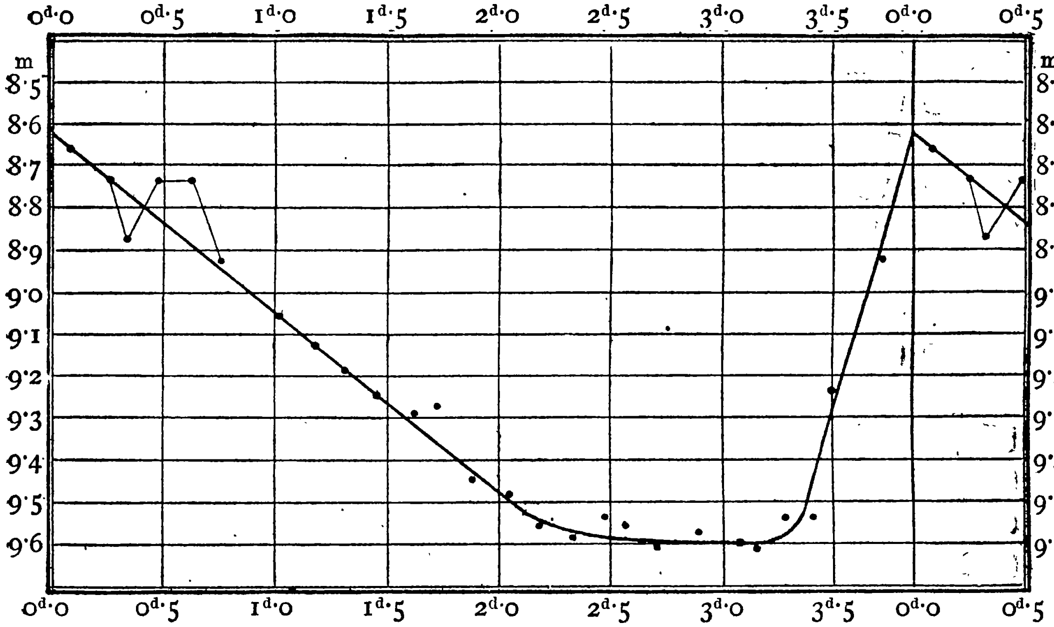
the diagram, that the observations are satisfactorily represented by the mean light curve excepting at about $0^{d}{\cdot}5$ after maximum. The observations in general appear to be represented quite as well by a straight line as by anything else in the nature of a smooth curve between maximum and 2·2 days after that epoch, and I am inclined to think that this is the true form, and that the discordances should be ascribed to errors of observation. As a matter of fact, the comparisons with the comparison star *f* have not always been altogether satisfactory, and an additional comparison star about midway in brightness between this star and *b* is much wanted. However, at least twice as many observations as those included in the present discussion are needed in order to derive a perfectly satisfactory light curve, and it is possible that the discordant observations at about half a day after maximum are not wholly due to errors of observation, but may indicate the existence of a hump or secondary maximum. This must be left to future observation to decide.



Light Curve of *Y Aurigæ*.

The separate observations composing the mean values in the last table are in pretty satisfactory agreement generally, but there are considerable discordances in the case of the last two groups. The star was at this time at the most rapid part of its rise, and a very slight acceleration or retardation in the actual time of maximum consequently here produces a large effect on the brightness of the star. Similar differences are found to occur in the case of other short- (or very short-) period variables, and they are certainly due, in some cases at any rate, to the maximum really occurring a little earlier or later than it would normally do.

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With regard to the rejected observations, all of these are marked as being either certainly or possibly affected by cloud, with two exceptions. These are observations 64 and 84 of Tables II. and IV. A re-examination of the original records fails to indicate any reason why these two observations should be discordant. The differences from the mean light curve are respectively $-0^{\mathrm{m}}{\cdot}39$ and $+0^{\mathrm{m}}{\cdot}32$.

As the mean light curve B represented in the diagram differs to some extent from the provisional curve A, the times of the mean maxima have been determined again by means of the former curve. The observations were also plotted afresh on squared paper as reduced by the Elements II. The dates and times of these more definitive mean maxima as thus redetermined are stated in Table VI.

TABLE VI.

Definitive Mean Maxima.

E.	Obs. Mean Maximum.	Computed Maximum (III.).	O−C. d	No. of Obs.
9	J.D. 2415455·367	5455·371	−0·004	33
24	5513·343	5513·256	+0·087	30
51	5617·417	5617·449	−0·032	25
110	5845·130	5845·130	0·000	9
150	5999·407	5999·490	−0·083	9
201	6196·285	6196·299	−0·014	5
299	6574·525	6574·481	+0·044	18

And from the above revised times of maximum the following final elements (Elements III.) have been obtained by the method of least squares :—

$$\text{Maximum} = \text{J.D. } 2415420{\cdot}64 + 3^{\mathrm{d}}{\cdot}8590 \text{ E.}$$

The computed times of maximum according to these elements are given in column 3 of Table VI., and the differences O—C in column 4. These differences are a little suggestive of the existence of a third term.

In the *A.N.* 3744 Dr. E. Hartwig published two observations of this star, made on 1901 July 25 and 26 respectively. The magnitude is given as 9·2 on both nights. The former of these observations is $1^{\mathrm{d}}{\cdot}09$ and the latter $2^{\mathrm{d}}{\cdot}09$, after the computed time of maximum, and the differences from the mean light curve B are $+0^{\mathrm{m}}{\cdot}10$ and $-0^{\mathrm{m}}{\cdot}31$ respectively. The star must have been low and in an unfavourable position for observation at the times of these observations, so that the differences are not greater than what might be expected under the circumstances.

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TABLE VII.

Concluded Elements of Y Aurigæ.

Period of variation	$3^{d}\cdot8590 = 3^{d}\ 20^{h}\ 36^{m}\ 58^{s}$
Epoch of maximum	1901 Feb. 4, $15^{h}\ 22^{m}$ G.M.T. = J.D. 2415420·64
Maximum brightness	8·63 mag.
Minimum „	9·60 „
„ to maximum	$0^{d}\ 17^{h}\ 31^{m}$ *
Maximum to minimum	$3^{d}\ 3^{h}\ 6^{m}$
Ratio of increase to decrease... ...	0·23

On the Relative Brightness of Stars. By J. E. Gore.

If the parallax of a star is known, its absolute brightness, or the total amount of light emitted by the star in terms of the Sun's brightness taken as unity, can be easily computed. In the following table I have computed the amount of light in terms of the Sun's light emitted by those stars for which a fairly good parallax has been found. To find the stellar magnitude to which the Sun would be reduced if removed to the distance indicated by the star's parallax, I have used the formula given in my paper in the *Monthly Notices*, vol. lxiii. p. 168 (June 1903), namely

$$M = \log\left(\frac{1}{p}\right) + 0{\cdot}07$$

where p is the parallax, and Sun's stellar magnitude $= -26{\cdot}5$.

In column 4 the Harvard photometric magnitude is given, except for a few faint stars which are not given in the Harvard Catalogues. In column 5 the best determination of the parallax is given, those marked with an asterisk being perhaps the most reliable; in column 6 the spectrum as observed at Harvard is given; in column 7 the Sun's magnitude if removed to the distance of the star, computed from the above formula; and in column 8 the ratio of the star's light to the Sun's light, if both are supposed placed at the same distance from the Earth. In those cases in which the star is a binary, the mass of the system, computed from the best orbit hitherto computed, is given in the column of remarks.

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* But nearly the whole amount of the increase takes place in less than twelve hours.